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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,343	04/12/2001	Michael Barnes	005651/ETCH/CHMBR/JBI	2416

7590

01/28/2004

APPLIED MATERIALS, INC.  
2881 SCOTT BLVD., M/S 2061  
SANTA CLARA, CA 95050

EXAMINER

CROWELL, ANNA M

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 01/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.	Applicant(s)
09/834,343	BARNES ET AL.
Examiner	Art Unit
Michelle Crowell	1763

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —  
Period for Reply

## A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-802)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1, 8-10, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al. (U.S. 5,766,364) in view of Vukelic (U.S. 5,268,034).

Referring to Figures 1-5 and column 3, line 21-column 4, line 60, Ishida et al. discloses a plasma reaction chamber comprising: a chamber 1; and a plasma reaction electrode 106, 109, 105, the electrode comprising: a first upper plate 109 for the transfer of RF energy, the upper plate being made of electrically conductive material, and having a first plurality of holes cut into it; a second lower plate 105 for the transfer of RF energy, the lower plate being made of electrically conductive material, and having a second plurality of holes cut into it; and a plurality of pins 30b inserted into the respective first and second pluralities of holes to connect the upper

and lower plates (col. 3, line 60-col. 4, line 40); wherein the upper and lower plates are connected with the pins to form a plenum chamber 109a,109d (see Figs. 3 and 5). Additionally, an outer ring 10c surrounds the upper and lower plates.

Ishida et al. fails to teach that the pins are made of a thermally conductive material such as aluminum.

Referring to Figures 2a, 2b, 2c, column 4, lines 43-68, and column 7, lines 38-52, Vukelic teaches that it is well known to use aluminum pins 226 as a fastener for an aluminum-perforated plate 224 (upper or lower plates). Aluminum has good milling and manufacture properties with light weight and good temperature characteristics (col. 4, lines 23-27). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the pins of Ishida et al. out of a thermally conductive material such as aluminum as taught by Vukelic since aluminum has good milling and manufacture properties with light weight and good temperature characteristics.

With respect to claim 8, Ishida et al. discloses a lid 11 disposed over the upper plate 109.

With respect to claim 9, Ishida et al. fails to specifically teach the material of the lid, however it is well known in the art for chamber lids to be made of aluminum. Additionally, Ishida et al. states that the materials of construction for the primary elements are made of aluminum alloy, pure aluminum, or stainless steel. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention for the lid of Ishida et al. to be made of aluminum since a known material used for chamber components such as a chamber lid.

4. Claims 2-4, 6, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al. (U.S. 5,766,364) in view of Tomoyasu et al. (U.S. 5,888,907).

The teachings of Ishida et al. have been discussed above.

Ishida et al. fails to teach a dielectric cover.

Referring to Figures 1 and 4, and column 5, lines 44-58, Tomoyasu et al. teaches a showerhead 30 including a dielectric cover 40, a head body 42, and gas spouting holes 36, 38. Gas spouting holes 36, 38 are provided in the showerhead 30 to supply reactive and inactive gases. The dielectric cover 40 is made of a conductive material such as silicon carbide or amorphous carbon (ceramic materials). The dielectric cover 40 directs radicals to the wafer W. In addition, the dielectric cover 40 is bonded to the head body 42. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lower plate of Ishida et al. with the dielectric cover as taught by Tomoyasu et al. since this would direct radicals to the wafer W.

5. Claims 5, 7, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al. (U.S. 5,766,364) in view of Hillman (U.S. 5,997,649).

The teachings of Ishida et al. have been discussed above.

Ishida et al. fails to show O-rings.

Referring to Figure 1 and column 8, lines 33-44, Hillman shows a plurality of O-ring seals 72 (first and second O-rings) and 74 are provided at various interface surfaces in order to maintain a seal between the showerhead and the insulator plates 50, 52. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the upper

and lower plates of Ishida et al. with the seals as shown by Hillman since this would prevent gases from escaping the chamber.

Ishida et al. fails to show an outer ring made out of ceramic material.

Referring to Figure 1, column 7, lines 10-34, column 8, and lines 48-51, Hillman shows a showerhead assembly 20 comprising a lower insulator plate 50 (outer ring). The insulator plate 50 takes the form of an annular plate or ring (col. 7, lines 17-20). In addition, the insulator plate 50 is made of aluminum nitride (ceramic material) (col. 8, lines 48-51). The insulator plate 50 surrounds the showerhead 44 to prevent electrical contact between showerhead 44 and the chamber body 12. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the outer ring of Ishida et al. with the ceramic material as shown by Hillman since this would prevent electrical contact between the chamber wall and the upper and lower plates.

#### ***Response to Arguments***

6. Applicant's arguments with respect to claim 1-10 and 14-16 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *gmc*

*[Signature]*  
GREGORY MILLS  
SUPERVISOR  
ART UNIT 1763